The whole English press was at once engaged in a discussion of the case . . . and to this day the discussion still goes on! Another stupidity of the same sort is perpetrated in England in the mode of collecting the tickets upon a railroad train. *As there is no way of passing through the cars*, they must be collected, of course, from the outside; but, instead of doing as the American conductors *used to do* under the *old system*, and as is now done upon the Austrian railways—passing along from door to door on the outside steps while the cars are in motion—the train is stopped a mile or two out of town, and there it stands till the tickets have been collected! *The idea of changing the shape of the cars, so as to allow a passage from one to another, and through the middle of each*, would probably shock John Bull as an innovation certain to prove fatal to the British constitution. The old style of carriages is religiously preserved. . . . . Part of the benches are cushioned; those are the first-class cars for the aristocracy. Others are of hard, plain boards, as comfortless as they can well be made, and these are for the common people! With all their boasted perfectibility the railways in England are not half as comfortable for travellers as those in the United States, and far less so than those of France. John Bull knows all this perfectly well, but he is so obstinately and doggedly conservative, so resolute in resisting change of every sort, that years will elapse before any essential improvements will be made."

——Mr. Derby, an American railway director of some celebrity, gives the following statement of the progress and returns of the railway system in the United States:—

"We number more than 13,000 miles of railway; have crossed the Alleghanies; and are pushing across the fertile fields and level prairies of the West. Since my letter of last year, we have added on an average ten miles per day to our lines, and I see nothing to prevent this rate of progress for five years to come, for our Western lines are constructed with rails of 60 lbs. per yard, and properly equipped for 3,000*l.* to 3,500*l.* per mile, and a traffic of 10*l.* per mile per week gives ten per cent. By the close of next year our great lines will strike the Mississippi, and a railway is already in progress from St. Louis to the verge of civilisation, 300 miles up the Missouri. Lines of telegraph and railway will soon move westward from this point to the Pacific. Our railways are generally successful. The lines of New England average over six per cent. Many of the New York Southern and Western lines pay seven to eight per cent. on bonds, and earn ten to twenty per cent. and besides this are annually gaining in receipts, while success with all seems to be merely a question of time. I think you may estimate that the whole railway investments of the United States will earn this year over seven per cent. on the aggregate capital. While the new lines are moving onward, the older enterprises have improved their tracks, equipages, and speed. Among the more prominent inventions of the day is a machine designed to bore tunnels, one of which is commencing a four mile tunnel in this state under the Hoosac Mountains, at a point where the elevation, 1,200 feet above the railway, render shafts impracticable. This machine has been used for smoothing large slabs of granite with success, and has an engine of sixty-horse power."

WORKS IN CHICHESTER.

The north transept of Chichester Cathedral, which has been used for ages as the church of the extensive parish of the subdeanery, is about to be restored to the cathedral. A new church has recently been erected, in the West-street, for the use of the parishioners, from designs by Mr. R. C. Carpenter, in the style which prevailed in the middle part of the 14th century, and consists of a nave, chancel, north and south aisles. It is built of Caen stone, and the interior is finished, and fitted up with open oak seats of a character that accords with the building. There are sittings for 500 persons, and since it has been consecrated and opened for divine service, the church has been well filled. The foundation of the tower at the west end has been laid in, and this, with other external work, is shortly to be proceeded with. The windows are of the Flamboyant branch of the Decorated style, and that in the chancel, of five lights, surmounted with flowing tracery, has just been filled with stained glass, the work of Mr. Warrington, of London. The centre light, which is somewhat higher than the rest, contains the representation of the crucifixion of our Lord, and at the foot of the cross is Mary Magdalene, tenderly embracing it, and showing her sympathy by stanching the wounds of his bleeding feet. The opening on the right of this contains the figures of the beloved disciple, St. John, supporting the mother of our Lord, and in that on the left Joseph of Arimathea, with Mary, the wife of Cleophas, making up the group of symbolism of the chief subject of the centre. The subjects of the remaining two lights relate to the obituary character of the window; and illustrate the texts, "Joseph shall put his hand upon thine eyes," and "Knowest thou that the Lord will take away thy master from thy head to-day." These texts are introduced on scrolls at the foot of each subject, and beneath the centre one, "Behold thy son, behold thy mother." All these are surmounted by lofty canopies, which terminate in foliated finials, and these are continued by similar ornamentation throughout the tracery, so arranged as to form vesicas, in the principal one of which is the figure of our Lord ascending; in others are angels in Praise and Joy. At the foot of the window runs the following inscription:—"Memorial to Eleanor Braithwaite, aged 67, erected by her son George, Vicar and Subdean. Anno Domini 1852."

Notices of Books.

The Principles and Practice of Hydraulic Engineering applied to arterial and thorough Drainage, the Conveyance of Water, and Mill Power. Second edition. By John Dwyer, C.E. Dublin, M'Glashan; London, Orr and Co. 1852.

Although, in some of the sections, Mr. Dwyer's book more particularly applies to Ireland, all who are concerned in hydraulic engineering, drainage, conveyance of water, earthwork, &c. will find it very valuable. The headings of some of the sections will show the nature of its contents:—On rivers; the quantity of water which annually falls in these countries; catchment basins; to determine the number of cubic feet any catchment basin will yield; proper form of channels, and the velocity of water in them; discharge of water through pipes and sluices; water as motive power; thorough drainage; tables of excavations and embankments. Many undertake works of the kind treated of here without any knowledge of the principles which should regulate them, and the result is, in many cases, disappointment and loss. It would surprise some of these worthies even to be told that the discharge of a 12 inch-pipe, with an inclination of 1 in 100, will be six times that of a 6-inch pipe with the same rate of inclination. Among the tables are some for finding the velocity and discharge per minute of rivers, canals, pipes, &c. calculated from the Chev. de Buat's formula:—

$$30\sqrt{d-0{\cdot}1}$$

$$\sqrt{s}=L,\ s=1{\cdot}6-0{\cdot}3\sqrt{d-0{\cdot}1}=\text{velocity per second}$$

The great difference in the quantity discharged by two pipes of the same diameter laid at different inclinations must never be overlooked. Thus, according to these tables, a 4-inch pipe, which, laid with an inclination of 1 in 100, will discharge running half full 7.56 cubic feet per minute,—laid on an incline of 1 in 10, will discharge 30·8 cubic feet per minute.

One of his tables shows, and the result is important as respects the *shape* of conduits for the discharge of water, that while a conduit 4 feet 3 inches deep, with a bottom of 4 feet, will discharge 4.086 cubic feet per minute, a conduit 2 feet deep will require to have a bottom of 18 feet to discharge the same quantity.

Our author's explanation of logarithms is simple and clear:—

"Until lately, the use of logarithms was principally, if not exclusively, confined to the mathematician or astronomer: they are now, with great propriety and advantage, introduced into a variety of calculations, which has the effect of shortening the operations to a degree altogether incredible to those unacquainted with their properties or application. They are a series of numbers in *arithmetical* progression, corresponding to others in a *geometrical* progression, by means of which *addition* supplies the place of multiplication, and, consequently, *subtraction* that of division. The relation of logarithms to natural numbers may, perhaps, be more intelligibly explained by two series of numbers, one in arithmetical and the other in geometrical progression, thus—

Logarithms,	0	1	2	3	4	5	. . . . .
Nat. numbs.	1	10	100	1,000	10,000	100,000	. . . . .

In this series it is evident that the addition of any two terms of the upper line together, their sum will indicate that produced by the multiplication of the corresponding terms of the lower line: thus 2 + 4 = 6, in the upper line, is the index standing over 100 × 10,000 = 1,000,000 in the lower line.

By inspection of the above series, it will be seen that the logarithms are in *arithmetical* progression, while the natural numbers are in a *geometrical* progression. The log. of 1 being 0, the log. of 10 is 1, the log. of 100 is 2, and of 1,000 is 3, and 10,000 = 4, &c.; hence the logarithms of all numbers between 1 and 10 will be greater than 0 and less than 1; that is, they will be decimals. Between 10 and 100 the logarithm will be greater than 1 and less than 2; that is, they will be expressed by 1 with decimals annexed; between 100 and 1,000 they will be expressed by 2, with decimals annexed; between 1,000 and 10,000, by 3, with decimals annexed, and so on.

Mr. Dwyer's book, it will be seen, merits the attention of our readers.

Hand-book of Natural Philosophy and Astronomy. By Dionysius Lardner, LL.D. *Second Course.—Heat—Common Electricity—Magnetism—Voltaic Electricity.* Taylor, Walton, and Maberly, Paternoster-row.

It was originally intended to include astronomy and meteorology in the present volume of this sterling work; but, judiciously, we think these subjects have been excluded, and are destined to form a separate volume to follow the present.

This is a strictly elementary work,—so much so that it would be found difficult to quote from it anything not exclusively adapted to that class of readers for whom it is designed, namely, those who desire to learn in a general way the present state of the various elementary branches of physical science, or who, having already done so, wish occasionally to refresh their memories on some one topic or other.

In general each subject is pretty well posted up to its most recent state of advancement, or at least to its latest established facts. On some points, however, we would have liked to have seen a little more of some of the more recent investigations, such as those on magnetism, and diamagnetism, including, by the way, some account of the magnetic, or magneto-electric telegraph, which ought to have been added to the chapter on the electro-magnetic and electro-chemical telegraphs. Of what the class of readers for whom the work is intended, however, most require, a substantial view of the general state of physical science, there is an abundant store, stripped of all mathematical and other details and difficulties.

The New Patent Law; its History, Objects, and Provisions; the Protection of Inventions Act,—14 Vict. c. 8, and 15 Vict. c. 6, and the Patent Law Amendment Act,—15 & 16 Vict. c. 83. By T. Webster, M.A., Barrister-at-Law. Elsworth, Chancery-lane.

In this pamphlet there is much useful matter in small compass and at a moderate price, the whole overlooked by one long versant, as Mr. Webster has been, with the subject. The new edition of his "Law and Practice of Patents," will be issued so soon as all the necessary forms, rules, regulations, and proceedings shall have been sanctioned. Those already decided on by the commissioners are here given. From what we hear, there seems to be some reason to fear that unless the stipulations of the new law in respect to what constitutes a separate and distinct patent be liberally interpreted by the commissioners, it is capable of giving countenance to much annoyance and unnecessary expense. If so, however, the ultimate thorough reform of the law will only be hastened by such grievances; but we have better hopes of it, even as it is.